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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant :	Shoji NAKAMURA *et al.*	Art Unit :	1772
Serial No.:	09/911,855	Examiner :	Jane J. Rhee
Filed :	July 23, 2001		
Title :	MOLDED GLASS SUBSTRATE FOR MAGNETIC DISK AND METHOD FOR MANUFACTURING THE SAME		

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANT'S BRIEF UNDER 37 C.F.R. § 1.192

Dear Sir:

Pursuant to the requirements of 37 C.F.R. § 1.192, please consider the following document as the Appellant's Brief in the referenced application currently before the Board of Patent Appeals and Interferences.

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surfaces (12) during the molding process. (Specification, page 7, line 32 – page 8, line 5).

The molding-free face property of the outer surface (13) corresponds to a surface that is *not* processed in any way, in order to achieve the end product. Specifically, the outer surface (13) does not come in contact with the mold or with any mechanism that would alter the characteristics of the surface. The extent of surface smoothness inherent in the molding-free face may be observed by viewing the surface with a scanning electron microscope (SEM). In the case of a ground and polished glass surface, fine marks resulting from grinding and polishing may be observed under an SEM. On the other hand, the molding-free face is a smooth surface that does not include such imperfections when viewed under the SEM. (Specification, page 4, lines 7-12). Both the mirror surface property of the upper and lower principal surfaces (12) and the molding-free face property of the outer surface are a result of the molding process.

To produce the molded glass substrate discussed above, two precision planar processing members (22, 23) are manufactured such that the surfaces which are to come in to contact with the glass material during the molding process have the desired average surface roughness, small waviness, flatness, and any other additional properties the manufacturer would like to transcribe onto the upper and lower principal surfaces (12) of the molded glass substrate (11). (Specification, page 8, lines 11-18). The precision planar processing members (22, 23) are then combined with a barrel die (24) to produce a molding block (21), as shown in Figure 2 reproduced below.

TABLE OF AUTHORITIES

Cases

Application of Pilkington, 56 C.C.P.A.1237, 1240 (CCPA. 1969) 16

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I. Real Party in Interest

The real party interest in the referenced application is Matsushita Electric Industrial Co. Ltd., assignee of all rights and interest in the application. Assignment to Matsushita Electric Industrial Co. Ltd. from the inventors, Shoji Nakamura, Takahisa Kondou, Hidenao Kataoka, and Yoshiyuki Shimizu, was recorded in the United States Patent and Trademark Office on January 11, 2002, at reel 012459, frame 0196.

II. Related Appeals and Interferences

To the best knowledge of the Appellant and the Appellant's Legal Representative, there are no other appeals or interferences that will directly affect, be affected by, or have a bearing on the decision of the Board of Patent Appeals and Interferences (the Board) in the pending appeal.

III. Status of Claims

Claims 1-20 were presented in the application as originally filed. In the Applicant's reply (dated December 5, 2002) to a joint Restriction Requirement and Office Action dated September 11, 2002, claims 1-8 were elected for further prosecution on the merits. Claims 9-20 were cancelled. Claims 1-4 and 6-8 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,383,404 ("the Sakai patent"). Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the Sakai patent in view of U.S. Patent No. 6,277,465 ("the Watanabe patent").

IV. Status of Amendments

All amendments submitted to the Examiner during prosecution have been entered in the record. Claim 1 was amended in a Reply Under 37 C.F.R. § 1.111 filed December 5, 2002, in response to an Office Action dated September 11, 2002. The claims of record, as amended,

are presented in Appendix A.

V. Summary of the Invention

The invention described in the application relates to a molded glass substrate and a method for making the molded glass substrate. Figure 1 illustrates a molded glass substrate in accordance with one embodiment of the invention.

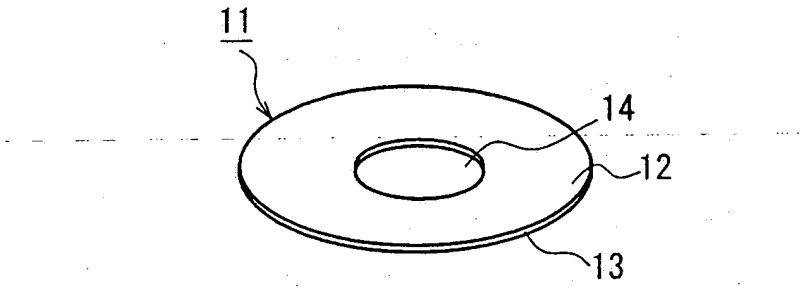
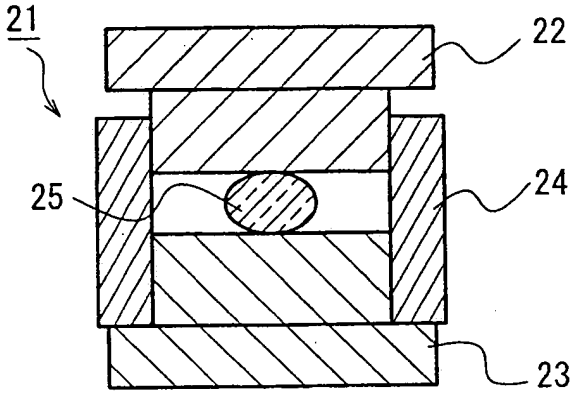


Figure 1 – Molded Glass Substrate

As seen in Figure 1, the molded glass substrate (11) includes upper and lower principal surfaces (both denoted by reference (12)), an outer surface (13) joining the upper and lower principal surfaces (12), and an inner surface (14). The upper and lower principal surfaces (12) have a mirror surface property and the outer surface (13) has a molding-free face property. (*See, e.g.,* Specification, page 7, lines 32-37). The mirror surface property of the upper and lower principal surfaces (12) corresponds to a surface that is essentially free of surface deviations (quantified by small waviness) and free of scoring. (*See, e.g.,* Specification, page 8, line 32 – page 9, line 5). Surface deviations and scoring are typically the result of grinding and polishing the upper and lower principal surfaces of a glass substrate, both of which are not performed in the invention. Further, the mirror surface property includes a transcribed property. Specifically, the surface properties present on the molding die (*i.e.,* the precision planar processing members (22) and (23) in Figure 2 below) are *faithfully transcribed* onto the upper and lower principal



F I G. 2

Figure 2-Molding Die

Glass material (25) is then inserted into the molding block (21). The volume of glass material (25) inserted into the molding block (21) is determined such that the resulting molded glass substrate (11) has a particular outer diameter, within a specified dimensional tolerance. In addition, the volume of glass (25) is determined such that the when the glass material is being molded, the outer surface does not come into contact with the barrel die (24). Further, the thickness of the resulting molded glass substrate is determined by adjusting the barrel die (24) size (Specification, page 8, lines 1-4).

The glass material (25) is subsequently heated within the molding die (21), via heaters embedded within the precision planar processing members (22, 23). The glass material (25) is heated until the heaters reach a predetermined temperature (typically above the softening point of the glass material (25)). Pressure (P) is subsequently applied to bring the precision planar processing members (22, 23) in to contact with the barrel die (21). The heaters are subsequently turned off, and the entire molding block (21) is cooled while maintaining pressure (P). After being sufficiently cooled, the molding die (21) is disassembled to provide a molded

glass substrate. (Specification, page 8, lines 18-31). After the molded glass substrate has been removed from the molding die (21), a core drill and a chamfer are used to make the inner surface (14) (Specification, page 10, line 30 – page 13, line 13).

While the process of manufacturing the molded glass substrate has been described with respect to a single temperature and pressure sequence, additional temperature and pressure sequences may also be used to produce the molded glass substrate (*See e.g.,* Specification, page 9, lines 7 – page 10, line 29).

Advantages of the invention include reducing industrial waste products and reducing cost of manufacture because a precision molding process is used. A glass substrate is manufactured using a small number of steps to reduce industrial waste. A low cost is achieved by reducing the number of manufacturing processes required to produce the substrate. Furthermore, the invention allows the outer circumference to be formed as a molding-free face, so that a surface property equivalent to that of a polished surface can be provided. This makes it possible to suppress the generation of dust from the glass itself and eliminate the need for chamfering. (*See, e.g.,* Specification, page 3, line 6-15).

VI. Issues

The issues presented on Appeal are:

1. Whether claims 1-4 and 6-8 are unpatentable under 35 U.S.C. § 102(e) as being anticipated by the Sakai patent;
2. Whether claim 5 is unpatentable under 35 U.S.C. § 103(a) as being obvious over the Sakai patent in view of the Watanabe patent.

VII. Grouping of Claims

Claims 1-4 and 6-8 stand or fall together.

Claim 5 stands or falls by itself.

VIII. Argument

A. Claims 1-4 and 6-8 are not anticipated by the Sakai patent.

The Examiner rejected claims 1-4 and 6-8 under 35 U.S.C. § 102(e) as being anticipated by the Sakai patent.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). Further, "the identical invention must be shown in as complete detail as is contained in the claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989). In addition, the elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, *i.e.*, identity of terminology is not required. *In re Bond*, 910 F.2d 831 (Fed. Cir. 1990).

Prior to determining whether the Sakai patent anticipates the claims, one must first determine which limitations recited in the claims should be accorded patentable weight. Specifically, the Examiner has asserted that the following limitations do not have patentable weight because they are directed towards methods of production:

> wherein a mirror surface property of molding die is transcribed onto the upper and lower principal surfaces, [...]; molded; formed between precision planar processing members; molding-free face[1]; ground; polished; and fire-polished. (Final Office Action, February 24, 2003, pages 4-5).

In analyzing the patent, the Examiner classified the claims that included the aforementioned limitations as product-by-process claims, and has applied relevant case law. Specifically, the Examiner has used the guidelines set forth in MPEP § 2113, which state that claims presented in product-by-process format are treated, for the purpose of patentability, as

claims to the product. *In re Thorpe*, 777 F.2d 695 (Fed. Cir. 1985). Further, where the product specified in a product-by-process claim appears to be identical to a product in the prior art, even though made by a different process, the product may be rejected and the burden falls on the applicant to show that the products differ in an unobvious way. *In re Marosi,* 710 F.2d 799 (Fed. Cir. 1983). In other words, in considering the patentability of a product-by-process claim, the product described by the claim is not considered limited by the process set out in the claim. *Scripps Clinic & Research Foundation v. Genentech Inc.* 927 F.2d 1565 (Fed. Cir. 1991).

However, there are exceptions to the general rule. Specifically, the structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. *See In re Garnero*, 412 F.2d 276 (C.C.P.A. 1979) (holding "inter-bonded by interfusion" to limit structure of the claimed composite and noting that terms such as "welded," "intermixed," "ground in place," "press fitted," and "etched" are capable of construction as structural limitations.) Thus, process limitations in a claim should not be considered totally irrelevant. Rather, where the process limitations impart characteristics or properties to the product, not shared with or suggested by the prior art product, a rejection would be inappropriate. Courts have recently found this line of reasoning persuasive, *See Ex Parte Michael E. Rorabaugh, Darryl F. Garrigus and Juris Verzemnieks*, Appeal 1998-0186, 2002 WL 31003025, at *2 (Bd.Pat. App. & Interf.) (non-published opinion).

The Applicant respectfully asserts that the limitations, "molded, ground, polished, and fire-polished," should be accorded patentable weight, as these terms are capable of construction

[1] In the Advisory Action dated June 4, 2003 the Examiner conceded that the term "molding free face" was a structural limitation and subsequently asserted the "molding free face" is inherent. (Advisory Action, June 4, 2003 pages 2-3).

as structural limitations in view of *Garnero, supra.* Further, the Applicant asserts that the limitations, "wherein a mirror surface property of molding die is transcribed onto the upper and lower principal surfaces" and "formed between precision planar processing members" should be accorded patentable weight as they impart definitive structural characteristics.

Specifically, the limitation "wherein a mirror surface property of molding die is transcribed onto the upper and lower principal surfaces" defines the finished state of the surface of the glass substrate. More specifically, the finished state of the surface is a *mirror image* of the surface of the precision planar processing member that came into contact with the surface of the glass substrate. (Specification, page 7, line 35- page 8, line 1). Further, the limitation "formed between precision planar processing members" produces a glass substrate essentially free of surface deviations (quantified by small waviness) and scoring (Specification, page 4, lines 13-18). Small waviness is a measure of deviations of a surface from its nominal shape at widely spaced wavelengths. Small waviness may be a function of work deflections, vibrations, chatter, and material strains attributed to an individual machine. Thus, small waviness indicates the presence of deviations within the surface of the molded glass substrate. (*See e.g.,* Specification, page 8, line 10 – page 9, line 6).

Accordingly, because the aforementioned limitations impart definitive structural characteristics, namely, that a finished state of the surface is a mirror image of the surface of the precision planar processing member that came into contact with the surface of the glass substrate and, a surface essentially free of deviations and free of scoring, the aforementioned limitations should be accorded patentable weight.

Turning to the issue of anticipation, the Applicant asserts that claims 1-4 and 6-8 are not anticipated by the Sakai patent. Claim 1 recites a molded glass substrate for a magnetic disc which includes upper and lower principal surfaces, an outer surface, which joins the upper and

lower principal surfaces, and an inner surface joining the upper and lower principal surfaces, such that the inner surface defines a through-hole in a central portion of the substrate. The outer diameter of the magnetic disc satisfies a desired dimensional tolerance by selecting a predetermined volume of glass and the thickness of molded glass substrate, such that the desired dimension and tolerance is satisfied by adjusting a barrel die size. As a result of the molding processes, the upper and lower surfaces have a mirror surface property transcribed thereon and the outer surface has a molding-free face. In addition, the upper and lower surfaces also have a small waviness of no greater than 0.5 nm.

In contrast to producing a *molded* glass substrate as recited in claim 1, Sakai discloses a *ground* glass substrate. Specifically, Sakai discloses a glass substrate that is generated using a roughing step to obtain the initial diameter and thickness of the glass substrate (Sakai Patent, col. 14, lines 56-63), a mirror finishing step to apply a mirror finish to the outside diameter and inside diameter of the glass substrate (Sakai Patent, col. 15, lines 20-35), and a lapping step to improve the average surface roughness (Sakai Patent, col. 15, lines 40-45). After the lapping step has been completed; the glass substrate is subjected to a series of polishing and chemical treatment steps to produce the final end product (Sakai Patent, col. 15, lines 55-col.17, line 42).

The Sakai patent does not disclose a glass substrate having an upper and lower principal surface having a mirror surface property, as defined above, an outer surface having a molding-free face, a glass substrate having a surface essentially free of deviations and free of scoring, or an upper and lower principal surfaces having a small waviness of no greater than 0.5nm.

The Sakai patent is silent with respect to the "mirror surface property" limitation. Specifically, while the Sakai patent discloses that the upper and low principal surfaces may have a polished surface, there is no teaching or suggestion to have upper and lower principal surfaces

which are mirror images of the corresponding surfaces of the precision planar processing members they came in contact with, or a surface that is essentially free of surface deviations and free of scoring. In fact, given the process disclosed by the Sakai patent (*i.e.,* the roughing step, the lapping step, etc.), the upper and lower principal surfaces of the glass substrate produced by the Sakai patent invariably have significant deviations and scoring as a result of the roughing and lapping steps, both of which are not present or required in the present invention.

With respect to the limitation "wherein the upper and lower principal surfaces have a small waviness Wa of no greater than 0.5 nm," the Examiner has conceded that the Sakai patent does not explicitly teach or suggest this limitation. However, the Examiner asserted that these limitations are inherent because the Sakai patent discloses a glass substrate having the same thickness and diameter range (Sakai patent, col. 13, lines 42-43) as the glass substrate disclosed in the present invention. (Office Action, September 11, 2002, page 4). Applicant has attempted to show that the waviness is not inherent in both the Response filed December 5, 2002, and the Response filed May 9, 2003. In both instances, the Examiner has rejected Applicant's arguments and evidence showing that waviness is not inherent.

Specifically, the Examiner's reply to the Response filed September 11, 2002, stated that

> Sakai et al discloses that each of the principal surfaces has a maximum height Ry of no greater than 5nm (col.5, lines 3-4), Sakai et al. also discloses that when the height distribution of the peaks is not exceeding 5[sic], the roughness becomes relatively uniform therefore obtaining a small waviness. Since Sakai et al discloses the same surface roughness, maximum height, thickness and diameter it is inherent that the waviness is no greater then[sic] 0.5nm.

(Final Office Action, February 24, 2003, page 5). In light of the Examiner's response to Applicant's arguments, and specifically, the Examiner's apparent misunderstanding of the difference between waviness and roughness, the Applicant attempted to more clearly show the how waviness and roughness are independent of one another in the Response filed May 9, 2003.

Specifically, in the Response filed May 9, 2003, the Applicant explained that waviness is a measure of deviations of a surface from its nominal shape at widely spaced wavelengths, whereas roughness is a measure of fine irregularities of the surface at the shortest wavelength. While waviness may be a function of work deflections, vibrations, chatter, and material strains attributed to an individual machine, roughness typically includes irregularities in the process or method of manufacturing.

In other words, roughness is directly related to a process of engineering a surface, where waviness is considered independent of a process. For example, two magnetic disks may be made by the same process, and thus, the magnetic disks may have a similar roughness. However, the magnetic disks may exhibit a substantially different waviness, because different devices were used to produce the two magnetic disks. This is illustrated by the following figure, which is presented herein for the sole purpose of facilitating understanding of similar roughness, having substantially different surface profiles (*i.e.*, a cross-section of the shape of the surface in a plane perpendicular to the surface).

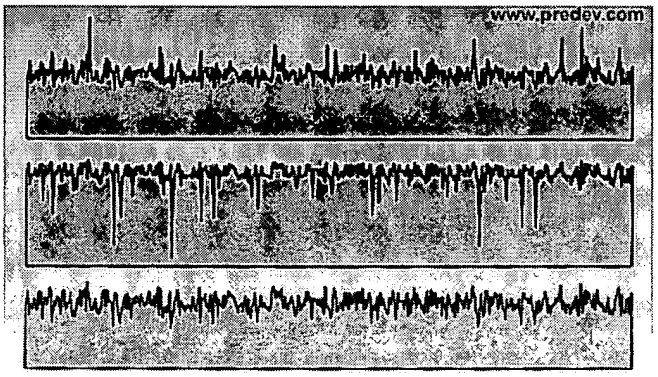


Figure A- Same Roughness, Different Profile

In the above Figure A, the three surfaces have the same roughness, but obviously different surface profiles. Thus, substantially the same roughness (and/or maximum height of the profile (Ry)) does not *necessitate* substantially the same waviness. Therefore, the

substantially the same roughness characteristic and maximum height of the profile are not inherent to the waviness of a surface. It is well known in the art that roughness of a surface profile may be substantially the same, however, other characteristics, *e.g.*, waviness, spacing, *etc.*, must be taken into account to distinguish surface profiles of magnetic discs.

With respect to the assertion that waviness no greater than 0.5 nm is inherent in the disclosure of Sakai, the Applicant respectfully refers to MPEP § 2112, which states, "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). Additionally, MPEP §2112, citing *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999), sets forth that

> To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is ***necessarily present*** in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' (emphasis added)

Finally, MPEP §2112, citing *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990), states that

> In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. (emphasis in original)

Accordingly, objective evidence or cogent technical reasoning to support the conclusion of inherency must be provided by the Examiner if the assertion that waviness of no greater than 0.5 nm is maintained.

The Examiner's reply to the above arguments made in the Response filed May 9, 2003, that waviness is not inherent, stated that

> [W]aviness is a measure of deviations of a surface from its nominal shape at widely spaced wavelengths [and] therefore does not further describe the physical features of the end product of the present invention. [...] [W]aviness is a

> measurement that is independent of the process wherein the measure of waviness varies because different devices were used to produce the two magnetic disks that are made by the same process and have the same roughness. Therefore, waviness does not further limit the claim or change the physical component of the present invention. Since the surface roughness of the present invention is the same as the Sakai's invention it is inherent that Sakai has the same waviness as the present invention.

(Advisory Action, June 4, 2003, page 2). From the Examiner's reply, it is not clear how a measure, and more specifically, a limitation on the measure of deviations of a surface, does not describe a physical feature. It is clear from the case law that measures of surface deviations such as waviness are physical limitations. Specifically, the court in *Pilkington* found that the "appellant's float glass differs from conventional plate glass in certain important respects-- it has a lustrous fire finish and *lacks the surface distortion* or scoring resulting from grinding and polishing of the latter glass." *Application of Pilkington*, 56 C.C.P.A. 1237, (C.C.P.A. 1969) (emphasis added). Accordingly, waviness, which is analogous to surface distortion, is sufficient to distinguish various glass substrates for the purposes of patentability.

Further, with respect to the issue of waviness being inherent, in view of the arguments included above, the Applicant maintains that waviness is not inherent. Further, the Examiner has not provided any objective evidence or cogent technical reasoning to support the conclusion of inherency. Accordingly, a rejection that the limitation "wherein the upper and lower principal surfaces have a small waviness Wa of no greater than 0.5 nm" is inherent should not stand.

With respect to the limitation "wherein the outer surface is a molding-free face," the Examiner has conceded that the Sakai patent does not explicitly teach or suggest an outer surface having a molding-free face. However, the Examiner asserted that this limitation is inherent in the outer surface of the glass substrate disclosed in the Sakai patent because the present invention and the Sakai patent both share the same surface roughness (Advisory Action, June 4, 2003). In view of the Examiner's response, the Applicant believes that the Examiner has misunderstood

the limitation "molding-free face." Specifically, the limitation "molding-free face" corresponds to the outer surface of the glass substrate that is *not* processed in any way in order to achieve the end product. Thus, the outer surface does not come in contact with the mold or with any mechanism that would attempt to alter the surface characteristics of the surface. Moreover the specification makes clear the distinction between a surface that is processed and a surface having a molding-free face. The specification states that:

> [T]he outer surface of its circumference is formed as a molding-free face. The judgment about whether the surface is a molding-free face can be made by observing it with a scanning electron microscope (SEM) or the like. In the case of a polished surface, fine marks made by polishing are left. On the other hand, the molding-free face is a smooth surface.

(Specification, page 4, lines 7-12). Thus, the Examiner's attempt to equate a processed outer surface of the glass substrate as disclosed by the Sakai patent is clearly incorrect. The Sakai patent clearly discloses an outer surface, which is ground and polished. These processes result in surface deviations and scoring, both of which are excluded from the invention. (Sakai Patent, col. 14, lines 56-67). Accordingly, the limitation "molding-free face" is not inherent.

In view of the above, the Sakai patent fails to disclose a glass substrate having an upper and lower principal surface having a mirror surface property, as defined above, an outer surface having a molding-free face, a glass substrate having an upper and lower surface essentially free of deviations and free of scoring, or an upper and lower surface having a small waviness no greater than 0.5nm. Accordingly, claim 1 and its dependents are not anticipated by the Sakai patent. Therefore, the Applicant respectfully requests this Board to reverse the decision of the Examiner.

B. Claim 5 is not obvious over the Sakai patent in view of the Watanabe patent.

To establish a *prima facie* case of obviousness, three basic criteria must be met.

MPEP § 706.02 (j). First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091 (Fed. Cir. 1986). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974); MPEP § 706.02(j); MPEP § 2143.03. If an independent claim is nonobvious under 35 U.S.C. § 103(a), then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

A conclusion of obviousness may be established on the basis of one or more prior art references. However, before a conclusion of obviousness may be made based on a combination of references, there must have been a reason, suggestion, or motivation to combine the teachings of those references. *Pro-Mold and Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568 (Fed. Cir. 1996). Such a suggestion may be found expressly in the prior art references themselves (*see, e.g.*, *In re Sernaker*, 702 F.2d 989, 994 (Fed. Cir. 1983)), or it may come from knowledge by those skilled in the art that certain prior art references, or disclosures in those references, are known to be of special interest or importance in the particular field. In any event, "a showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential evidentiary component of an obviousness holding.'" *C.R. Bard, Inc. v. M3 Sys. Inc.*, 157 F.3d 1340, 1352 (Fed. Cir. 1998).

The Examiner rejected claim 5 under 35 U.S.C. § 103(a) as being obvious over the Sakai patent in view of the Watanabe patent. The Examiner states that the Sakai patent fails to disclose that the principal surface has a surface flatness no greater than 3 μm. (Office Action,

September 11, 2002).

Although the Watanabe patent discloses a principal surface having a flatness no greater than 1 μm (Watanabe Patent, col. 1, lines 23), it does not disclose a glass substrate having a mirror surface property, as defined above, an outer surface having a molding-free face, a glass substrate having an upper and lower surface essentially free of deviations and free of scoring, respectively, or an upper and lower principal surfaces having a small waviness of no greater than 0.5nm. Claim 5 depends from claim 1 and includes these limitations. Thus, the Watanabe patent does not teach or suggest what is missing from the Sakai patent. Accordingly, the Sakai and Watanabe patents, whether considered separately or in combination, can not render claim 5 obvious for the same reasons described above with respect to claim 1. Therefore, the Applicant respectfully requests this Board to reverse the decision of the Examiner.

IX. Conclusion

The Summary of the Invention provided in Part V, *supra*, in combination with the arguments presented in Part VIII, *supra*, clearly show that claims 1-8 are patentable over the prior art of record. Therefore, the Applicant respectfully requests that the Board reverse the Examiner's rejection of claims 1-4, 6-8 under 35 U.S.C §102 (e) and the Examiner's rejection of claim 5 under 35 U.S.C. §103(a). Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference No. 04558/053001).

Respectfully submitted,

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#45,079

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X. Appendix

A. Claims of Record in the Application

[c1] (Previously Presented) A molded glass substrate for a magnetic disk comprising:

upper and lower principal surfaces formed by molding between precision planar processing members;

an outer surface joining the upper and lower principal surfaces, wherein the outer surface is a molding-free face; and

an inner surface joining the upper and lower principal surfaces, the inner surface defining a through-hole in a central portion of the substrate,

wherein a mirror surface property of a molding die is transcribed onto the upper and lower principal surfaces, and an outer diameter satisfies a desired dimensional tolerance by selecting a predetermined volume of a glass material,

wherein a thickness of the molded glass substrate satisfies a desired dimension and tolerance by adjusting a barrel die size, and

wherein the upper and lower principal surfaces have a small waviness Wa of no greater than 0.5 nm.

[c2] (Original) The molded glass substrate according to claim 1, wherein each of the principal surfaces has an average surface roughness Ra of no greater than 0.5 nm.

[c3] (Original) The molded glass substrate according to claim 1, wherein each of the principal surfaces has a maximum height Ry of no greater than 5.0 nm.

[c4] (Original) The molded glass substrate according to claim 1, wherein each of the principal surfaces has a small waviness Wa of no greater than 0.5 nm.

[c5] (Original) The molded glass substrate according to claim 1, wherein each of the principal surfaces has accuracy of no greater than 3 μm in flatness.

[c6] (Original) The molded glass substrate according to claim 1, wherein the inner surface is ground and polished.

[c7] (Original) The molded glass substrate according to claim 1, wherein the inner surface is fire-polished.

[c8] (Original) The molded glass substrate according to claim 1, having a thickness of 0.3 mm to 1.0 mm and a diameter of 25.4 mm to 88.9 mm.

[c9] - [c20] Cancelled